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Determining Sex of Plains Pocket Gophers by Incisor Width

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Biologists studying food habits of predators can often determine the prey species but not the sex of the prey from remains found at dens, in stomachs, scats, or pellets of predators. Knowledge of the sex of prey is useful in evaluating predator food habits as well as indicating sex specific differences in prey behavior.

Plains pocket gophers, *Geomys bursarius*, can be easily identified by the presence of two prominent grooves on the face of each upper incisor. This makes them ideal specimens for studying prey remains. In this paper, we present data that can be used to identify the sex of plains pocket gophers from the width of their incisors.

Two subspecies of the plains pocket gopher occur in Nebraska (Jones 1964). *Geomys b. lutescens* occurs in the western two-thirds and *G. b. majusculus* occurs in the eastern third of the state. The latter is larger than the former and in each subspecies males are larger than females as indicated by total length (Jones 1964).

METHODS

Specimens were obtained by trapping. Most of the *lutescens* and *majusculus* analyzed in this study were captured in Dawes and Lancaster Counties, Nebraska, respectively. The gophers were taken to the laboratory and the sex of all specimens was ascertained by examining the reproductive tracts.

The width of an upper incisor was measured to the nearest 0.01 mm with dial type vernier calipers at the approximate midpoint of the portion of the tooth protruding from the alveolar socket. We attempted to measure incisor widths for adults only, but differentiating adults from young is dificult at certain times of the year (Vaughan 1962). In the present study we used date of capture, body size, molt patterns, and degree of ossification of the skull to exclude young gophers. In addition, we assumed that all gophers with incisor widths less than 2.50 mm were young. These criteria probably did not exclude any adults but may have included skulls of some young gophers in our analysis.

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RESULTS AND DISCUSSION

Each subspecies was characterized by highly significant differences between sexes for incisor width (Table 1), but the frequency distributions overlapped considerably. This likely was due in part to including some young gophers in the sample. However, differences in the width of incisors between sexes were substantial. For *lutescens*, 56% (54 of 97) of the incisors of males were wider than 3.04 mm whereas only 8% (13 of 160) of those from females exceeded 3.04 mm. In *masjusculus*, the separation is better; 62% (50 of 81) of the incisors from males and 4% (4 of 96) of those from females exceeded 3.17 mm.

TABLE 1. Frequency and means of incisor widths of plains pocket gophers.

Incisor width interval (mm)	*G. b. lutescens* male (N = 97)	*G. b. lutescens* female (N = 160)	*G. b. majusculus* male (N = 81)	*G. b. majusculus* female (N = 96)
2.50 - 2.62	2%	10%	6%	3%
2.63 - 2.76	11	29	1	12
2.77 - 2.89	14	39	9	37
2.90 - 3.03	16	13	5	17
3.04 - 3.16	28	7	17	26
3.17 - 3.30	25	1	27	4
3.31 - 3.43		1	10	
3.44 - 3.57	3		14	
3.58 - 3.71			9	
3.72 - 3.85			2	
Mean ± SD	3.03 ± 0.21	2.81 ± 0.28[a]	3.22 ± 0.29	2.93 ± 0.17[b]

Student's t-test, [a]t = 6.78 ($P<0.001$), [b]t = 8.38 ($P<0.001$).

Although overlapping measurements reduce the likelihood of identifying a single incisor as belonging to a male or female, rather reliable inferences can be made about the sex composition of a sample of pocket gophers. Also, the technique may provide good separation of sexes during seasons when young animals would not be found in samples (e.g., breeding season).

Since plains pocket gophers seldom venture out of their tunnels, little is known of their aboveground activities. Knowing the sex composition of gophers preyed upon by owls and canids, for example, would provide a better understanding of their breeding habits and dispersal, and other aboveground activities. Using the technique described above, researchers studying food habits of predators may now determine the sex of these two subspecies of plains pocket gophers. We encourage researchers to evaluate this technique in other pocket gophers as well as other mammalian prey species.

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